Dermatology in a nutshell
Dr. A. Wong-Powell

Skin diseases are very common and about a quarter of the UK population will suffer a skin issue with symptoms of itching or pain, if not treated correctly they could lead to secondary issues affecting activities of daily living. These conditions however are rarely fatal.

Skin as we know it has 4 distinctive layers:

- Epidermis
- Basement membrane zone (BMZ)
- Dermis
- Subcutaneous layer

Epidermis made of stratified epithelium arises from dividing basal keratinocytes. Starting from the basal layer (at the bottom of epidermis), the cytoskeleton is made up of keratin filaments and desmosomal proteins produced by the basal layer – giving strength and prevents shedding. In the granular layer, semipermeable skin barriers are formed by the intercellular lipid bilayers secreted by keratinocytes. In stratum corneum (cornified layer) the nuclei is lost, the tough impermeable layer is made up of various proteins. Changes in the lipid metabolism and protein expression in the outer layers allow normal shedding of keratinocytes, which also plays a role in immunity by secreting various cytokines. Melanocytes secretes melanin in the basal layer, protecting against UV irradiation. Merkel cells plays a role in sensation. Langerhans' cells found in suprabasal layer, acts as antigen-presenting cells (APC) and contains cytokine CCR6.

The BMZ – made of complex protein structures and type IV and VII collagen, laminin, integrins and hemidesmosomal proteins. Skin fragility or blistering conditions are caused by deficiencies in these proteins.

Dermis, a matrix layer of collagen and elastin, contains blood and lymphatic vessels, muscles, nerves, appendages (sweat glands, sebaceous glands, hair follicles) and variety of immune cells.

Subcutaneous layer mainly consists of adipose tissue, nerves, and blood vessels, providing insulation and lipid storage.

History taking in dermatology is similar to that of general medicine. It is important to establish time course, distribution of lesions, symptoms, relieving and aggravating factors, any previous skin issues or treatments, sun exposure, diet and the usual past medical history, family history (atopy, psoriasis), drug and allergy history etc.

Basic terminology:

Macule: flat, circumscribed non-palpable lesion
Papule: small palpable, circumscribed lesion (<0.5cm)
Nodule: large papule (>0.5cm)
Plaque: large flat-topped, elevated, palpable lesion
Weal: itchy raised 'nettle rash' like swelling due to dermal oedema

Purpura: large macule or papule of blood in the skin which does not blanch on pressure
Petechia: pin-point sized macule of blood in skin
Ecchymosis: large confluent area of purpura / 'bruise'
Bulla: large fluid-filled blister
Vesicle: small fluid-filled blister
Excoriation: scratch mark

Common skin conditions:

01. **Bacterial infections**
- ***Impetigo***: highly infectious, common in children, honey crusted, spread by direct contact, mostly *Staph. Aureus*, take skin swabs. Treatment: topical fusidic acid TDS and antiseptic povidone iodine for 1 week. Oral antibiotics if extensive.
- ***Cellulitis***: hot, tender, erythematous; infection deep in subcutaneous layer, upwards spreading. Often unwell, high temperature, caused by *streptococcus*. Confirmation by serological titres. Treatment with oral or IV (extensive) antibiotics. Identify underlying cause, portal of entry.
- ***Boils (furuncles):*** deep-seated infection in skin, Mostly *Staph.*, painful red swellings, teenagers, recurrence in diabetes, immunosuppresion, large boils: carbuncles. Treatment: oral antibiotics, sometimes incision and drainage.

02. **Viral infections**
- ***Slapped cheek syndrome/fifth disease/erythema infectiosum***: parvovirus B19; mild viral illness followed by intense erythema on cheek and reticulate erythema in limbs.
- ***Herpes simplex virus (HSV):*** HSV type 1- direct contact, droplet infection, early childhood, once infected, cell mediated immunity, recurrent as cold sores. HSV type 2- after puberty, genital area, infections symptomatic and sexually transmitted. Treatment: aciclovir.
- ***Herpes Zoster/Shingles***: reactivation of varicella zoster virus (VZV) chicken pox. Tingling, pain followed by painful blistering eruption in dermatomal distribution. Occurs in crops, pustular, crust over, lasting 2-4 weeks, more severe in elderly. Complications: post-herpetic neuralgia, ocular disease, motor neuropathy. Treatment: analgesia, antibiotics (if secondary bacterial infection), aciclovir.
- ***Human papillomavirus (HPV)***: common cutaneous infection 'viral warts'. Different subtypes, papular lesions with coarse roughened surface, hands and feet mostly, small black dots – bleeding points in lesion. Treatment: difficult to treat effectively, topical keratolytc agent, cryotherapy, cautery, surgery, laser, injection.

03. **Fungal infections**
- ***Dermatophytes / ring worm***: 3 main genera; *Trichophyton, Microsporum, Epidermophyton,* identified by microscopy and cultures of hair, skin, nail etc. Spread by direct contact from other humans or infected animals – use of communal showers, swimming baths, sharing towels. *Tinea corporis (body), cruris (groin), pedis (foot), manuum (hand), capitis (scalp), unguium (nail).* Treatment: antifungal creams.
- ***Candida albicans***: yeast found in body's flora. Acts as opportunist, taking hold in skin when there is a warm moist environment; nappy rash or intertrigo in obese patients. Flexural areas are red, ragged peeling edge, few small pustules. Can affect mucosal surface of mouth or GI tract – patients taking broad spectrum antibiotics or immunospressed: superficial white, creamy pseudomembranous plaques. Treatment:

removing underlying cause, topical antifungal creams.

04. **Infestations**
- ***Scabies***: intensely itchy rash casued by mite *Sarcoptes scabiei*. Common in children, young adults. Spread by prolonged close contact, sexual contact. Itchy red papules occasionally vesicles/pustules. Web spaces of fingers and toes, flexural areas. Pathognomonic sign: linear or curved skin burrows. Treatment: topical scabicide.
- ***Lice***: blood sucking ectoparasites affecting scalp; head lice - *pediculosis capitis*, affecting body; *pediculosis corporis* and affecting genitals; pubic lice – crabs, *phthiriasis pubis*. Treatment: malathion, phenothrin, permethrin applications.

05. **Inflammatory rashes**
- ***Eczema***: inflammation of the skin. Vesicle or bullae may appear, skin can erythematous, dry, flaky, crusted, oedematous, itchy.
Atopic eczema: strong hereditary component, family history of atopy, asthma. High serum IgE levels. Common areas: flexural areas; elbows, ankles, behind knees. Treatment: avoid irritants, emollient, topical steroid if needed.
Seborrhoeic eczema: overgrowth of Pityrosporum ovale and strong immune response leads to inflammation and scaling seborrhoeic eczema. Common in Parkinsonism and HIV disease. Treatment: suppressive with mild steroid ointment.
Contact/irritant eczema: environmental agents. Treatment: avoidance of irritant, protective clothing.
- ***Psoriasis***: well demarcated, red scaly plaques, skin inflamed. Triggered by infection (group A Strep), drugs (lithium etc), UV light, alcohol abuse, stress. Unknown aetiology but may be T-lymphocyte driven disorder. 5% develops psoriatic arthritis. Treatment: control than cure, emollient, topical steroids, calcipotriol.

06. **Possible pre-malignant conditions**
- ***Solar keratoses/ actinic keratoses***: erythematous silver-scaly papules or patches with a conical surface and red base on fair skinned individuals. Treatment: cryotherapy, topical 5-fluorouracil cream.
- ***Bowen's disease***: intraepidermal carcinoma-in-situ rarely invasive. On exposed skin, isolated scaly red patch or plaque looking like psoriasis. Treatment: topical 5-fluorouracil cream, cryotherapy, curretage.

07. **Malignant cutaneous tumour**
- ***Basal cell carcinoma (BCC) / rodent ulcer***: most common, relate to excessive sun exposure, later life, exposed areas, slow growing papule or nodule which ulcerate, pearly edged. Treatment: surgical excision.
- ***Squamous cell carcinoma (SCC)***: more aggressive than BCC, metastasize if untreated. Relate to sun and can arise in pre-existing solar keratoses or Bowen's or result of chronic inflammation in lupus vulgaris. Keratotic, ill-defined nodule, may ulcerate, grow rapidly, examine lymph nodes! Treatment: excision or radiotherapy.
- ***Malignant melanoma***: most serious type of skin cancer as metastasis occurs early and causes death even in young people. Related to sun exposure. Other factors: atypical mole syndrome, giant congenital melanocytic naevi, lentigo maligna and family history of malignant melanoma. 4 types:
Lentigo maligna melanoma – patch of lentigo maligna develops a papule or nodule
Superficial spreading malignant melanoma – large flat irregularly pigmented lesion which grows laterally before vertical invasion.

Nodular malignant melanoma – most aggressive, rapidly growing pigmented nodule which bleeds or ulcerate. Rarely amelanotic and can mimic pyogenic granuloma.
Acral lentiginous malignant melanoma – pigmented lesions on palm, sole or under nail and usually present late.
Treatment: urgent wide excision of lesion, histological analysis to give Clark's level (depth) and Breslow thickness to predict prognosis and 5 year survival rates and further management.

Reference: Kumar & Clarke Clinical Medicine